

CLAIMS

1. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers of different types of container configurations, and the containers each containing a sample for pathology analysis and having an
5 identification indicator or identifying the sample and having one unique characteristic or a unique set of characteristics by which a container type can be identified, the apparatus comprises a container handling station located in a container transfer path of the containers and having a container handler arranged for receiving the containers sequentially, the handling station including a container
10 type identification means arranged to capture a container image or images containing said one or set of characteristics of a container received at the handling station and to analyse the captured image or images for extracting the one characteristic or set of characteristics of the received container, and to identify the container type by comparing the extracted characteristic or set of characteristics
15 with predetermined characteristics and sets of characteristics of known container types, wherein the container type is identified when the extracted characteristic or set of characteristics match or are within a predetermined range from matching one predetermined characteristic or one set of the predetermined characteristics for a known container type.
- 20 2. The apparatus according to claim 1 wherein the handling station includes a sample identification means for identifying the sample by reading the identification indicator on the received container and the read sample identification is used for the pathology analysis prescribed for the sample.
3. The apparatus according to claim 1 wherein the container identification
25 means is an image analyser and further includes a light source for illuminating the received container, said one unique or unique set of characteristics including at least one of a dimension or dimensions of the container, one or more areas of the container and the colour or colours of the cap of the received container.
4. The apparatus according to claim 3 wherein each of the containers has a
30 window through which interior of the containers can be viewed externally, the image analyser is arranged to detect the level and/or volume of the sample or

component of the sample for analysis and the handling station is provided with a controller which controls rotatable means arranged for rotating the received container for positioning the received container so that its window allowing the sample therein to be visible externally is positioned before the image analyser.

5 5. The apparatus according to claim 4 wherein the sample identification means produces a signal to the controller when the sample identification indicator is detected and the controller then controls the rotatable means to stop rotating the received container at a predetermined position so that the window is before the analyser.

10 6. The apparatus according to claim 2 wherein the sample identification means is a bar code scanner and the sample identification indicator is a bar coded label fixed to the received container.

15 7. The apparatus according to claim 1 wherein the apparatus comprises processing means having a storage device for storing said predetermined characteristic or set of characteristics relating to each container type.

20 8. The apparatus according to claim 2 wherein the apparatus comprises processing means having a storage device for storing said predetermined characteristic or set of characteristics relating to each container type, and the processing means is arranged to access sample information relating to analysis prescribed for each sample online from a remote computer or from the storage device.

25 9. The apparatus according to claim 8 wherein the received container is a primary container, and the distribution system having sample aspiration and dispensing means for aspirating volumetrically a predetermined portion of the sample in the received container and for dispensing a predetermined volume of the sample into one or more secondary containers, the apparatus utilises the sample information for the determination of whether or not aspiration of the sample in the received container is required, and, if required, the volume of the sample to be dispensed into one or each secondary container.

10. The apparatus according to claim 8 wherein the apparatus utilises the sample information for the determination of placement for the received container and/or any secondary container in a container distribution station.

17. A sample container handling apparatus for a pathology sample distribution system having a plurality of containers for dispensing pathological samples therein for pathology analysis, each container having a closed end and an open end, the apparatus comprises hopper means having an upper container receiving section for receiving said plurality of containers and a lower guide section for guidingly delivering one or more of the containers into a holder of holders respectively, and container alignment means arranged between the upper section and the lower section, and having a magazine with compartments, each of said compartments being configured for loading a container from said plurality of containers in the upper section, in a substantially horizontal orientation, the magazine being positionable in a manner to sequentially place said compartments over the lower guide section for releasing the containers in the compartments to fall into the guide section, the guide section being configured for aligning the containers released from the magazine from the substantially horizontal orientation to a substantially vertical orientation with the open ends positioned to receive samples when the containers are delivered to said holders.

18. The apparatus according to claim 17 wherein the magazine is in the form of a rotary magazine having circumferentially located compartments to hold the substantially horizontally orientated containers loaded from the container receiving section, a sideways plunger member arranged in co-operation with the rotary magazine and the guide section positioned beneath the rotary magazine to change the orientation of the containers released from the rotary magazine from the horizontal to the vertical orientation, in operation the sideways plunger member pushes the closed end of a container to be released from one of the compartments so that the displaced container released from the magazine falls into a side of the guide section that guides the released container to fall in the vertical orientation, said sideways plunger member when not in contact with a closed end, does not push a container which when released, falls into the opposite side of the guide

which guides in the vertical orientation and having a magazine with compartments, each of said compartments being configured for loading a container from said plurality of containers in the upper section, in a substantially horizontal orientation, the magazine being positionable in a manner to sequentially place said compartments over the lower guide section for releasing the containers in the compartments to fall into the guide, the guide section being configured.

23. A pathology sample distribution system having a plurality of containers of different types and the containers each containing a sample for pathology analysis a pathology specimen, the system comprises a loading station for loading said containers, a container handling station arranged to receive the containers sequentially from the loading station, and a distribution station with areas or distribution holders marked for specific analysing processes, the handling station includes one or a combination of two or more of the apparatus as claimed in claim 1.

24. A pathology sample distribution system having a plurality of primary containers of different types and the primary containers each containing a sample for pathology analysis, and having a bar coded label affixed thereto, the system comprises:-

a container handling station having primary container identification means; the identification means including a bar code scanner arranged to sequentially scan bar coded labels on the primary containers transferred to the container handling station and an image analyser to analyse one or more characteristics of the primary container and/or the sample therein;

a capping station having primary container cap removal and replacement sample aspiration and/or dispensing means for aspirating and/or dispensing volumetrically proportions of the samples from the primary containers;

blockage detection means for detecting blockage of flow in the sample aspiration means;

means for removal of the cap on one of the primary containers for aspirating the sample therein and for recapping it with the removed cap following the aspiration;

hopper means having container alignment means for delivering secondary containers each with a closed end and an open end in a vertical orientation and with the open ends in position to receive samples to be dispensed from the aspirated samples;

5 secondary container sealing means arranged to seal the open end of each secondary container with a sample dispensed therein;

secondary container labelling means arranged to apply a label on each of the sealed secondary containers;

10 secondary container storage means for storing the secondary container in with applied label;

container conveyance means arranged to controllably transfer the primary containers and the secondary containers from the storage means;

wherein in operation each primary container containing a sample is sequentially presented to the identification means and the primary
15 containers are accepted or rejected according to given criteria; the identification means being arranged to reject a primary container when it fails to detect the given criteria and thereby indicating the presence of an error condition,

when the given criteria are detected the cap of the primary container is
20 removed and aliquots of the sample aspirated by the sample aspiration and/or dispensing means are dispensed in to a secondary container or secondary containers which are then sealed by the container sealing means and labelled by the labelling means and placed in the storage means; and whereby

25 the conveyance of the primary containers and secondary containers between operational steps is via the container conveyance means and the whole process is coordinated and controlled by a computerised laboratory information management system.